

Math 195 Quiz 7A

March 11, 2019

Name: ANSWERS

Instructions: No calculators! Answer all problems in the space provided! Do your rough work on scrap paper.

1. Complete the following rules:

(a)  $x^n \cdot x^m = x^{n+m}$  (b)  $x^{-a} = \frac{1}{x^a}$  (c)  $x^{m/n} = \sqrt[n]{x^m}$  (d)  $\frac{x^n}{x^m} = x^{n-m}$

(e)  $x^2 - y^2 = (x-y)(x+y)$  (f)  $x^3 - y^3 = (x-y)(x^2 + xy + y^2)$

2. Let  $(x_1, y_1)$  and  $(x_2, y_2)$  be two points in the Cartesian plane. State a formula that gives the:

(a) Distance  $d$  between the two points:  $d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

(b) The midpoint between the two points:  $M = \left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$

3. Suppose  $(-2, 3)$  and  $(4, 1)$  lie on the diameter of a circle. For this circle, find:

(a) Its center:  $(1, 2)$

(b) Its radius:  $\sqrt{10}$

(c) Its equation:  $(x-1)^2 + (y-2)^2 = 10$

4. The equation  $2x^2 + 2y^2 - 8x + 12y - 4 = 0$  represents a circle. State its center and radius.

(i) Center:  $(2, -3)$  (ii) Radius:  $\sqrt{15}$

**Bonus** (after attempting the problems above, do these for extra credit):

1. Suppose  $(x_1, y_1)$  and  $(x_2, y_2)$  lie on a straight line. For this line:

(a) Write an **equation** that gives its slope:  $m = \frac{y_2 - y_1}{x_2 - x_1}$

(b) Write down the *point-slope form* **equation** of the line:  $y - y_1 = m(x - x_1)$

(c) Write down the *slope-intercept form* **equation** of the line:  $y = mx + b$

2. Suppose  $m_1$  and  $m_2$  are the slopes of two non-vertical lines. What is the relationship between their slopes if:

(a) They are parallel:  $m_1 = m_2$

(b) They are perpendicular:  $m_1 \cdot m_2 = -1$  or  $m_1 = -\frac{1}{m_2}$  or  $m_2 = -\frac{1}{m_1}$